MOLLUSCA FROM CENTRAL AMERICA AND MEXICO.

BY HENRY A. PILSBRY.

Most of the forms described herein were collected by Mr. A. A. Hinkley during two visits to Guatemala. A few are added from various other localities, collected by Mr. S. N. Rhoads and others.

With the exception of *Neritilia*, a peculiar Neritid mollusk with a more specialized radula than others of its family, the species belong to genera already well represented in Mexico and Central America.

Salasiella hinkleyi n. sp. Fig. 2.

The shell is cylindric with tapering spire, glossy, finely, arcuately striate, with numerous irregularly spaced grooves indicating former peristomes. First three whorls rather slowly widening, after which the suture descends more rapidly, oblique to the previous whorls, each succeeding whorl at least double the width of that above it. The last whorl is flattened laterally. Aperture half the length of the shell. Outer lip arching very strongly forward in the middle. Columella very deeply concave above the truncation.

Length 8.5, diam. 3 mm.; $5\frac{1}{2}$ whorls.

Mountain side near the Tamosopo Sugar Company's place, San Luis Potosi. Also at El Abra.

This species changes so much with age that without a good series one would not readily connect the half-grown and the mature stages. After the third whorl the suture descends very rapidly, and the aperture becomes shorter in comparison with the total length. Moreover, the deep, arcuate grooves which characterize the fully adult shell are far weaker and less numerous in specimens of 6 mm. length or smaller.

It is closely related to *S. joaquinæ* Strebel, but adult specimens of the same length have a half whorl more and a shorter aperture. Probably the specimens from Diente, near Monterey, Nuevo Leon, referred to *joaquinæ* are immature *S. hinkleyi*.

16 specimens were taken at El Abra, the largest measuring, length 6, diam. 2 mm. The aperture is decidedly over half the total length at this stage. It is quite possible that the largest shell from the type locality (fig. 2) is an exceptionally large and old individual.

A review of the species of *Salasiella* known up to 1907 was given in the Manual of Conchology XIX, pp. 170–174. Since that time *S. browni* Pils., of the Canal Zone, has been described.

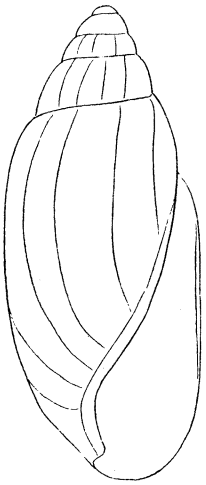


Fig. 1.
Salasiella guatemalensis.

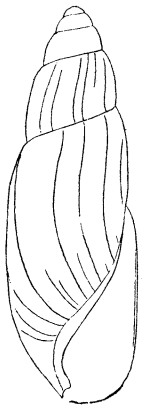


Fig. 2.
Salasiella hinkleyi.

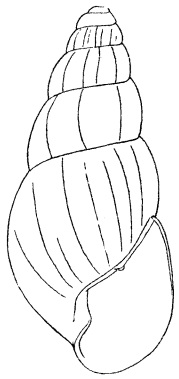


Fig. 3.
Leptinaria livingstonensis Hinkley.

Salasiella guatemalensis n. sp. Fig. 1.

The shell is oblong, pale yellowish, glossy, with fine, unequal growth-ripples. Spire rather short, conic, the apex obtuse. Whorls convex, the third hardly wider than the second, the rest rather rapidly widening, the last somewhat compressed laterally. Aperture more than half the total length. Outer lip strongly arching forward. Columella concave as usual.

Length 9.9, diam. 4, length of aperture 5.6 mm.; $5\frac{1}{2}$ whorls.

Gualan, Guatemala, S. N. Rhoads. Type and paratypes, No. 114,838, A. N. S. P.

This species stands near *S. browni* of the Canal Zone, but is stouter with shorter spire.

A few specimens, not fully mature, were taken by Mr. Hinkley at Jocolo.

Spiraxis livingstonensis n. sp. Pl. XI, fig. 1.

The shell is subulate, its diameter contained 3.7 times in the length, very pale yellow, composed of $9\frac{1}{2}$ rather strongly convex

whorls. First $2\frac{1}{2}$ whorls are smooth, following whorls sculptured with axial (vertical) ribs less than half as wide as their intervals, about 44 on the penultimate whorl. The upper ends of the ribs project, crenulating the suture. Aperture ovate; columella a little thickened, moderately sigmoid.

Length 9.25, diam. 2.5, aperture 2.3 mm.

Mountains west of Livingston, Guatemala (A. A. Hinkley).

This species is related to *S. sulciferus*, but it has less crowded, thinner ribs.

Spiraxis longior n. sp. Pl. XI, fig. 2.

The shell is subulate, very slender, the diameter contained about 3.8 times in the length, composed of $9\frac{1}{2}$ moderately convex whorls, of which the first $2\frac{1}{2}$ are smooth; apex obtuse; subsequent whorls sculptured with axial (vertical) ribs, which are just perceptibly sinuous, almost straight, and nearly as wide as their intervals. There are about 35 ribs on the penultimate whorl. On the last third of the last whorl the ribs become a little weaker in fully adult shells. Aperture ovate. Columella thin, weakly sinuous.

Length 8, diam. 2.1, length of aperture 2 mm.

Mountains west of Livingston, Guatemala (A. A. Hinkley).

A very slender form with small aperture, only one-fourth the length of the shell.

Pseudosubulina martensiana n. sp. Pl. XI, fig. 3.

The shell is slender, a little attenuated near the obtuse apex, corneous-buff, composed of 9 whorls, the first three strongly convex, the convexity diminishing subsequently, the later whorls being flattened, convex only near the sutures. The initial $\frac{3}{4}$ whorl projects and is smooth; the next two whorls are of about equal diameter, with sculpture of widely spaced axial ribs; on subsequent whorls the ribs are close, rounded, and as wide as their intervals, 40 standing on the penultimate whorl. On the last whorl the ribs disappear on the base, which is smooth. Apertures rhombic; columella moderately concave, deeply excised at the base.

Length 11, diam. 3, length of aperture 3 mm.

Mountains west of Livingston, Guatemala (A. A. Hinkley).

In the related *P. lirifera* Morel. the columella is represented as deeply concave, and there are more smooth whorls at the summit. Whether the shell described and figured as *P. lirifera* by Professor von Martens is really the species of Morelet is not quite certain.

Guppya elegantula n. sp. Fig. 4.

The shell is narrowly perforate, pyramidal, resembling *G. elegans* (Strebel) in form; pale cinnamon, fading at the summit. Surface above the periphery having a microscopic sculpture of fine, close, nearly vertical striae, cut by equally close spiral lines, but the latter are not everywhere developed; the base glossy, with engraved spirals only, far more widely spaced than on the upper surface. Outlines of the spire are slightly convex. Whorls quite convex, the last rounded peripherally in the adult stage (angular in the young). Aperture semilunar, not very wide.

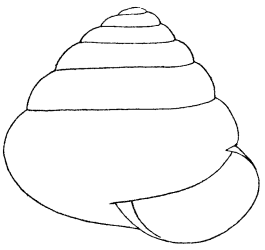


Fig. 4.

Alt. 3.2, diam. 3.3 mm.; $6\frac{1}{2}$ whorls.

State of Vera Cruz, Orizaba, 500 ft. above the town (Heilprin exped.). San Luis Potosi, canyon and falls below Valles (Hinkley, type loc.). Nuevo Leon, Diente near Monterey (S. N. Rhoads). Tamaulipas, in a canyon 4 miles west of Victoria, at about 3000 ft. (S. N. Rhoads.)

This is the species which was formerly identified as *G. elegans* (Strebel) by the writer. It is nearer that than to any other described species of the region, but on account of the smaller size, in some hundreds of specimens, the identification was not satisfactory. Specimens of the real *elegans* have now turned up, found in a vial labelled *H. selenkai*, from Mirador, one of the localities given by Strebel for *elegans*. It is a decidedly larger shell than the present species, probably confined to a warmer zone.

Specimens from Uruapam and other places in the State of Michoacan (S. N. Rhoads, 1899), have closer spirals on the base. A single immature specimen from Yautepec, Moreles (Heilprin exped.) probably belongs here. It was recorded by the writer as *elegans*.

G. elegantula was collected at Guadalajara, Jalisco, by McConnell and Crawford, 1909. It was taken in river drift at Tampico by Mr. Hinkley, but may have floated there from inland. It appears to be common and widely distributed.

A closely related form having about one whorl less, and with the aperture a little wider, was taken by Mr. Hinkley about old logs in the banana plantation, Maya farm, Quirigua (No. 28 of his 1913 collection). It is more highly conic than *G. pittieri* v. Marts., and may perhaps be a new species between *pittieri* and *elegantula*, or a subspecies of the latter.

Guppya gundlachi (Pfr.) was taken by Mr. Hinkley at Tampico and near San Dieguito, San Luis Potosi, and at the Maya Farm, Quirigua, Guatemala.

Guppya jalisco n. sp. Pl. XI, fig. 6.

The shell is minute, umbilicate (the umbilicus small, round, about one-ninth the diameter of the shell), light brown, somewhat glossy, very minutely striate, the striae decussated by close, microscopic spirals on the spire. The spire is somewhat dome-shaped, the outlines convex, summit obtuse. The whorls are closely coiled, nearly equal, very convex, the last one rounded peripherally and convex below. Aperture rather narrow, somewhat lunate. Columellar margin a little dilated.

Alt. 1.7, diam. 1.9 mm.; 5 whorls.

Guadalajara, Jalisco, Mexico. Type, No. 44,839 A. N. S. P., collected by R. A. McConnell, 1909.

A very small, compactly coiled shell, much smaller than *G. elegantula.*

Pseudohyalina maya n. sp. Pl. XI, figs. 5, 5a.

The shell is very minute, shaped much like *Z. nitida* (Müll.); pale yellow; openly umbilicate, the width of umbilicus somewhat more than one-fourth of the diameter of shell. Surface glossy, showing very faint growth lines under the microscope, but without spirals. Whorls well rounded, slowly increasing. Aperture lunate, somewhat oblique.

Alt. 1.1, diam. 1.75 mm.; very nearly 4 whorls.

Maya farm, Quirigua, Guatemala (A. A. Hinkley). Type and paratypes, No. 107,511 A. N. S. P.; also in coll. Hinkley.

This form is smaller than *Hyalinia permodesta* var. *minor* v. Martens.

Pseudohyalina opal n. sp. Pl. XI, figs. 7, 7a.

Shell very minute, corneous, smooth except for faint lines of growth, having a somewhat silky luster above, glossy beneath; rather narrowly umbilicate, the width of umbilicus contained about $6\frac{1}{2}$ times in the diameter of the shell. Whorls $4\frac{1}{4}$, convex, the last well rounded; suture compressed, narrowly margined. Aperture lunate.

Alt. 1.2, diam. 1.95 mm.

Polvon, Nicaragua. Types, No. 48, 523 A. N. S. P., collected by the McNeil expedition.

This little shell has been in the collection for many years under the name "*H. opal* McNeil Ms." It is more narrowly umbilicate than *Z. maya*, with the last whorl wider, viewed from above.

Averellia (Trichodiscina) hinkleyi n. sp. Fig. 5.

The shell is broadly and openly umbilicate, discoidal, the spire sunken a little; between cinnamon and cinnamon-brown, not banded.

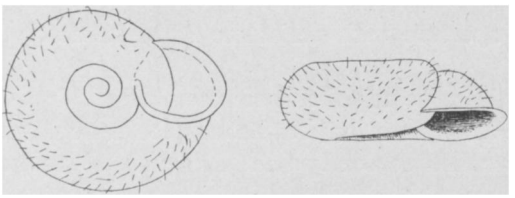


Fig. 5.—*Averellia hinkleyi.*

Surface dull, very densely and minutely papillose, and sparsely covered with long hairs arranged in oblique lines. These hairs are about 0.75 mm. long and about 1 mm. apart. On the penult whorl they persist in the sutural region only, and the first $1\frac{1}{2}$ whorls are smooth, without papillæ or hairs. The whorls are convex, the last rounded peripherally, the periphery above the middle; very deeply descending in front. The aperture is subhorizontal. Peristome pale vinaceous, narrowly reflected, the insertions of the lip remote, parietal callus very thin.

Alt. 5, diam. 12.3 mm.; width of umbilicus 3.7 mm.; of aperture 5 mm.; $4\frac{1}{3}$ whorls.

Mountains west of Livingston, Guatemala, A. A. Hinkley, 1913. Type and paratype, No. 107,533 A. N. S. P.

Distinct by its concave spire, very deeply descending last whorl and long hairs. The form and peristome are much as in *A. macneili* (Crosse), but there is no trace of the peculiar pits of that species.

Thysanophora rhoadsi n. sp. Fig. 6.

The shell is perforate, conic, light brown, dull. The spire is high, a little convexly conic. Whorls very convex, the suture deeply impressed. Sculpture of light, fine, somewhat oblique growth wrinkles, with much more strongly retractive cuticular raised threads superposed over them, but mainly worn from the type specimen. The last whorl has rather strong, irregular growth-wrinkles, and only slight traces of the retractive threads. The aperture is oblique, broad, columellar margin reflected.

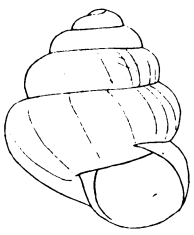


Fig. 6.
Thysanophora rhoadsi.

Alt. 2.8, diam. 2.5 mm.; 5 whorls.

Gualan, Guatemala, collected by S. N. Rhoads. Type, No. 114,836 A. N. S. P.

It is related to *T. cœcoides* (Tate), but differs by the more elevated shape, the altitude exceeding the diameter.

Drymaeus dombeyanus (Pfr.).

In a variety from Guadalajara, Jalisco, the last 2 or $2\frac{1}{2}$ whorls are white, the preceding 2 having some indistinct brown spots; lip and interior white; the spire is longer and aperture smaller than in the typical form.

Length 55, length of aperture with peristome 33 mm.; nearly 7 whorls.

Another variety from the same neighborhood resembles *D. dunkeri forreri* (Mouss.) in shape and coloration, but has the coarse sculpture of *dombeyanus*. It is streaked copiously with dull purplish brown, with scattered whitish spots on the streaks. Lip broadly expanded, as in *dombeyanus*. This variety may be called *D. dombeyanus ornatus*.

Length 41, diam. 22, aperture 24 mm.
" 43 " 26 " 27 "

Brachypodella subtilis pulchella (Martens).

This shell, which Mr. Hinkley has obtained in large numbers in the mountains west of Livingston, Guatemala, is not a form of *B. morini* as I formerly supposed. It is closely related to *B. subtilis* (Morel.), from which it differs by the smaller size and decidedly stronger sculpture. As in *B. subtilis*, the early whorls are smooth, while in *B. morini* they are finely striate. *B. subtilis*, of which I have an author's specimen, was described from northern Guatemala, and *pulchella* from Livingston.

Succinea panamensis n. sp. Pl. XI, fig. 4.

The shell is narrowly ovate with produced spire, pale yellow, not very glossy, with uneven sculpture of striæ and low folds. Whorls $2\frac{3}{4}$ to nearly 3, those of the spire convex, the last whorl weakly convex above, strongly so below the periphery. Aperture symmetrically ovate.

Length 13.3, diam. 4.5, length of aperture 5.7 mm.

Panama (Capt. Field); Las Cascades, C. Z. (Dr. A. P. Brown, 1910). Type and paratypes, 48,522 A. N. S. P.

I formerly identified this as "*S. recisa* Morel.?," but having now seen specimens of Morelet's species from the type locality, it is easy to see that the Panamic species is different. There are 26 specimens in the two lots, the largest 14.6 mm. long. As I cannot exactly match the form with any of the numerous Central American or Mexican species, it seems best to describe it as new, in order to have a name for the particular form of the Canal Zone.

Vaginulus moreleti C. & F.

Jocolo and Esmeralda Plantation, Rio Dulce, Guatemala (A. A. Hinkley).

Physa solidissima n. sp. Pl. XI, fig. 8.

The shell is imperforate, subglobular with very short spire, very thick and solid, composed of $4\frac{2}{3}$ whorls, the last one a little fuller above, convexly tapering downwards. Aperture semicircular; outer lip evenly arcuate, thick. Columella very heavy, with a low thick fold or convexity in the middle.

Length 8.2, diam. 6.3, length of aperture 6.9 mm.

Guadalajara, Jalisco, Mexico (McConnell and Crawford).

This is very unlike any American species I have seen, not only by its extreme solidity, but also by the very short contour. The surface is marked by a few growth-lines, but the minute sculpture, if any, and the color, cannot be ascertained until fresh specimens come to hand.

Planorbula obstructa (Morelet).

In a reservoir four miles north of Guatemala City, Mr. Hinkley took a large series of shells agreeing with the small typical form of *S. obstructa* except in the absence of internal "teeth" in the great majority of specimens, though a few show them. This form, which may be called mutation *anodonta*, is analogous to *S. dentiens* var. *cannarum* Morel. It measures 5 to 6 mm. in diameter and has only 4 whorls. There are also several other lots in the collection of the Academy, from places between Guatemala and Panama.

NERITILIA v. Martens.

The shell is neritiniform, with smooth columellar margin. Operculum with, on the calcareous internal face, a raised ledge along the basal and columellar edges, rising in a point or "peg" but without a distinct "rib." Radula with no central tooth, three laterals on each side, the outer one, or major lateral, large, oblique, with serrate cusp. Uncini or marginal teeth are extremely numerous with wide, short, serrate cusps. Genotype, *N. rubida* Pse.

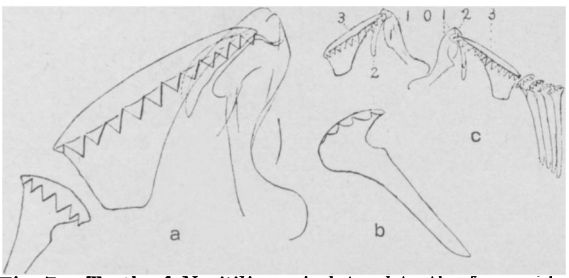


Fig. 7.—Teeth of *Neritilia*. A, lateral teeth of one side, with part of the first uncinus. B, the first uncinus lying flat, the cusps foreshortened. C, laterals of both sides with four uncini; 1, 2, 3, first, second and third or major laterals.

The operculum is unlike that of any known Neritid snail, but the chief peculiarity of the genus is in the radula. There is no central tooth whatever, the arrangement being as figured by Fischer for *Neritopsis*, the formula being ∞-3-0 3-∞, that of *Neritina* and *Nerita* being ∞-4-1-4-∞. The large inner lateral tooth is low, of very irregular form, without cusp and hard to see on account of its low relief. The second lateral is also low, narrow, without cusp, and interlocking with the larger lateral. The major lateral (*Hut* or *Schirmplatte* of German authors) resembles somewhat that of *Neritina reclivata* as figured by Troschel. The uncini are exceedingly numerous. Only the inner ones are drawn in the figure (fig. 7).

While the shell has some resemblance to that of *Lepyrium*, the operculum and radula are very different, and strikingly unlike *Neritina* (or *Theodoxus*).

Neritilia succinea guatemalensis subsp. Fig. 8.

The shell is Neritiform, hemispherical, solid, buff, the spire projecting very slightly. Embryonic shell very small, glossy; subsequent whorls not quite 2, rather dull, and smooth except for faint growth lines and on the latter part some impressed lines. The aperture is semi-circular, yellowish and smooth within, the lip sharp. The columellar margin is straight without teeth or notches. Callus flattened and plain, not very extensive, whitish towards the edge.

Alt. 3, greatest (oblique) diam. 4.7 mm.

Alt. 4. greatest (oblique) diam. 5 mm.

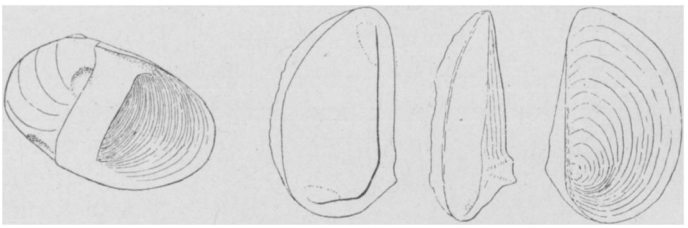


Fig. 8.—*Neritilia succinea guatemalensis*, shell and three views of operculum, the middle one an oblique view of the inside from the outer edge, showing greatest height of the ledge.

The operculum is slightly reddish towards the outer margin, a little concave, marked with growth lines, the nucleus near the basal end of the straight edge. The interior face is covered with a calcareous layer except for a reddish border along the outer arc. The basal and columellar margins have a raised ledge, which rises in a rather high summit at the basal end of the straight columellar edge; this

prominence is probably homologous with the peg of ordinary Neritid opercula, and the very slight projection above and connected with it may be the remnant of a rib. At each end there is an impressed scar of attachment.

Cavech River, Guatemala, at or near high tide, rare: found with *Neritina virginea* and *N. punctulata*, the latter in abundance. Collected by A. A. Hinkley.

The process of the operculum is so much shorter than that of *N. succinea* that we have possibly a new species; but very few have been examined.

Schasicheila hinkleyi, n. sp. Figs. 9, 10.

The shell resembles that of *S. pannucea* Morelet except that it is larger. It is thin, between chamois and cream-buff when clean; densely clothed with subequal spiral cuticular threads. The last whorl is indistinctly angular in front. The lip is somewhat ex-

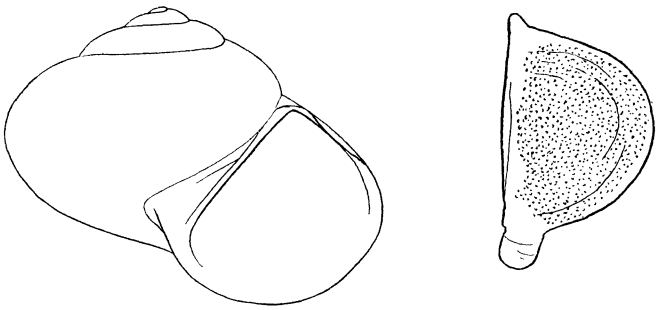


Fig. 9.—*Schasicheila hinkleyi*, shell and operculum.

panded, rather deeply notched above (about as in *S. pannucea*). The straight inner margin forms a raised ledge.

Alt. 8.5, diam. 11 mm.; $3\frac{2}{3}$ whorls.

The operculum has a short, obliquely projecting process at the upper, and a long one, parallel to the straight margin, at the lower angle; the concave outer face is papilose.

Chama, Guatemala, collected by A. A. Hinkley.

The operculum of *S. pannucea*, as figured by Fischer and Crosse, has no superior projection, and the lower process is far shorter than in this species.

Cyrenoidea guatemalensis n. sp. Pl. XI, fig. 9.

The shell is orbicular, rather plump, whitish under a very pale brown cuticle. Sculpture of very fine concentric striae with thin cuticular edges. It resembles *C. floridana* Dall except that the hinge plate is shorter and wider anteriorly, and the posterior end

of the shell is well rounded, while in *floridana* it is indistinctly truncate. The interior has numerous small solid lumps. The beaks are smooth.

Length 8.7, alt. 8.3, diam. 5.2 mm.

Livingston, Guatemala, A. A. Hinkley, 1913. Type, No. 107,532, A. N. S. P.

Eupera yucatanenenis minima n. subsp.

The shell resembles *E. yucatanensis* in contour, having a very narrow anterior and broad posterior end; of a uniform buff-corneous tint, sometimes (seven out of thirty-one specimens examined) maculate with dark gray. It differs from *E. singleyi* by the narrower anterior end and the more projecting beaks.

Length 5, alt. 3.3, diam. 2.5 mm.

Valles river, Valles, State of San Luis Potosi, Mexico, on the under side of rocks in shallow water, where there is a strong current in mid-stream (A. A. Hinkley).

Probably a distinct species. *E. yucatanensis* measures: length 10, alt. 7, diam. 5 mm.

Donax mediamericana n. sp. Pl. XI, fig. 10.

A species related to *D. striata* L., from which it differs by being smaller, comparatively longer, the alt. being three-fifths of the length; the angle between the anterior dorsal border and the posterior keel is decidedly and constantly larger; the anterior end is longer and tapers rapidly. The beaks are at the posterior four-tenths of the length. The keel is not so strongly expressed as in *D. striata*, and the posterior area is much more convex. The surface is shining, sculptured about as in *D. striata*. There are many radial riblets on the posterior end and extending on the valve about to the middle, whence they diminish gradually to the anterior end. The anterior-dorsal slope is almost smooth. The riblets crenulate the basal edge near the posterior angle, but less strongly than in *D. striata*. The teeth resemble those of *D. striata* except that the laterals are lower and much less robust.

The color is variable: white throughout; pink with concentric zones of a deeper shade, the interior pink, often violet at the ends; yellow, the interior white or pink and white, with violet ends; or yellow with dull bluish zones and beaks, the interior deep violet.

Length 22. alt. 12.5, diam. 7.9 mm. cotype.
" 21.5, " 13. " 7.9 " "
" 24.9, " 15. " 8.3 " "
" 25. " 14.9, " 9 " "

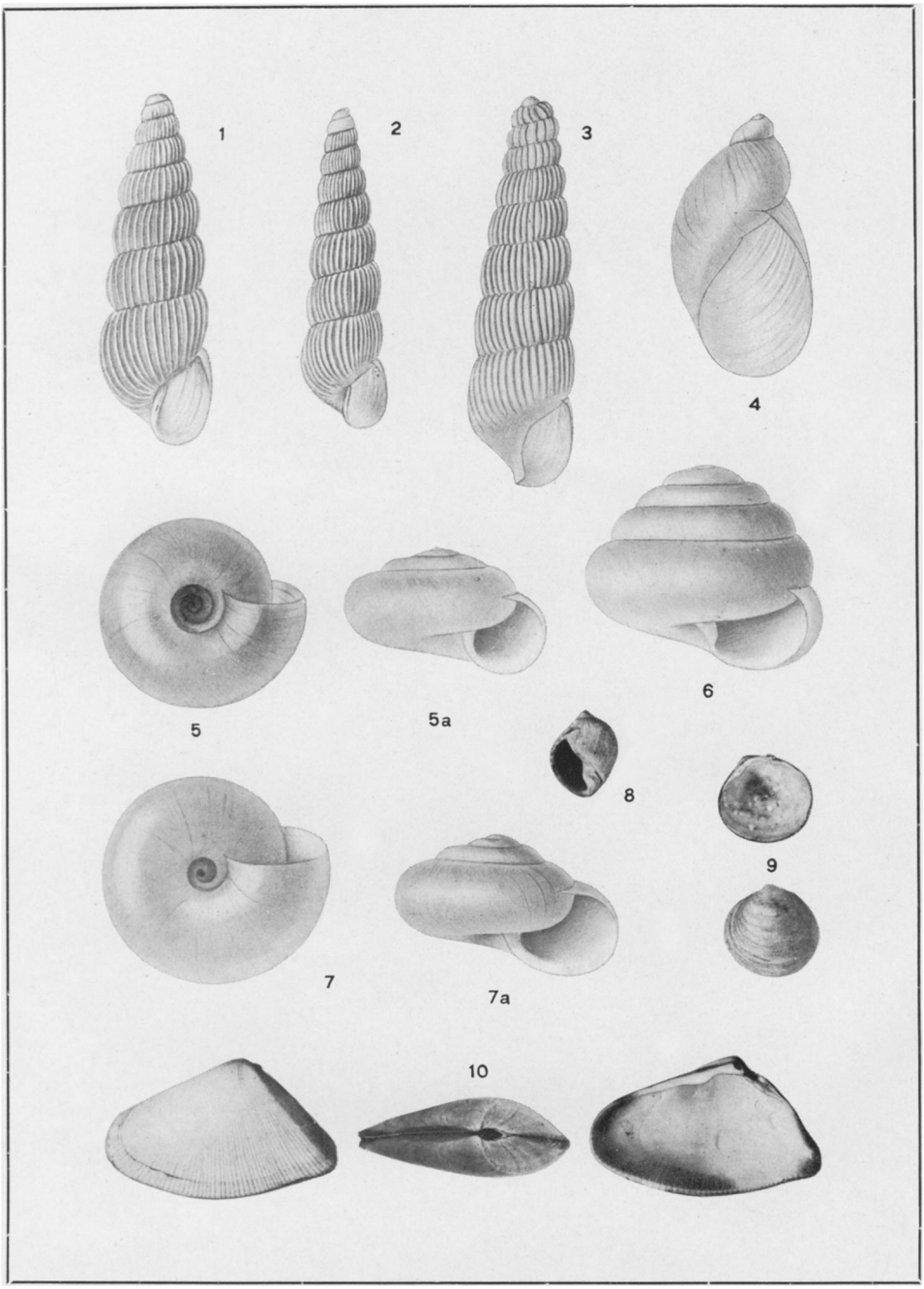
Livingston, Guatemala, collected by A. A. Hinkley. Type and cotypes, No. 45178 A. N. S. P.

This species was collected in considerable quantity by Mr. Hinkley; but although locally common, and belonging to a group in which species usually have a wide distribution, I have been unable to trace this shell in the literature. It is certainly distinct from *D. striata*, the common *Donax* of the Mosquito Coast. It resembles Roemer's figures of his *D. siliqua*, from an unknown locality, but in that species the beaks are more posterior (at the posterior fourth), and the posterior carina is therefore steeper; the posterior area is somewhat granulose and its outline more convex. Moreover, the teeth differ. None of the new forms in Bertin's monograph (Nouv. Arch. du Mus.) is nearly related.

NOTE.—Since this article was in type I have found that Schepman, in his Prosobranchia of the Siboga Expedition, Part I, 1908, p. 13, has already noticed the peculiarities of *Neritilia*, and figured the teeth of *N. rubida*, from Celebes. It is interesting to find American species with a similar radula.

EXPLANATION OF PLATE XI.

Fig. 1.—*Spiraxis guatemalensis* n. sp.
Fig. 2.—*Spiraxis longior*, n. sp.
Fig. 3.—*Pseudosubulina martensiana* n. sp.
Fig. 4.—*Succinea panamensis* n. sp.
Figs. 5, 5a.—*Pseudohyalina maya* n. sp.
Fig. 6.—*Guppya jalisco*, n. sp.
Figs. 7, 7a.—*Pseudohyalina opal*, n. sp.
Fig. 8.—*Physa solidissima* n. sp.
Fig. 9.—*Cyrenoidea guatemalensis* n. sp.
Fig. 10.—*Donax mediamericana* n. sp.



PILSBRY: MOLLUSCA FROM CENTRAL AMERICA AND MEXICO.